

## Remarks

Claims 1-10 are rejected under 35 USC § 101 because the claims are allegedly directed to non-statutory subject matter. In particular, the Office Actions states that the claimed subject matter is directed to a “mathematical algorithm.” Applicants respectfully traverse.

### Overview of Law: § 101

Under 35 USC § 101, patentable subject matter must have two basic criteria. First, the subject matter must be one of processes, machines, manufacturers, and compositions of matter. Generally, three categories are not included as patentable subject matter: (1) abstract ideas, (2) laws of nature, and (3) natural phenomena. Second, the subject matter to be patented must be “useful.” Applicants’ claimed subject matter meets both of these criteria.

### Overview of Issues

Applicants contend that independent claims 1, 6, and 9 recite “a computer implemented method.” As clearly supported in the law, computer implemented methods are “processes” per 35 USC § 101. The issue, however, is whether the “processes” of claims 1, 6, and 9 fall within the excluded patentable subject matter (i.e., (1) abstract ideas, (2) laws of nature, and (3) natural phenomena). The Office Action contends that the claims are directed to non-statutory subject matter of a “mathematical algorithm.” Applicants respectfully disagree. Applicants respond with at least two arguments: First, the claims are not directed to a mathematical algorithm, and the claims are limited to a practical application. Second, even assuming arguendo that the claims do contain a mathematical algorithm, the claims do not consist solely of mathematical operations.

### **Overview of Law: Mathematical Algorithms**

The law clearly states that mathematical algorithms can form part of statutory subject matter. The Supreme Court stated:

Their process admittedly employs a well-known mathematical equation, but they do not seek to pre-empt the use of that equation. Rather, they seek only to foreclose from others the use of that equation in conjunction with all of the other steps in their claimed process .... Our earlier opinions lend support to our present conclusion that a claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula, computer program, or digital computer.  
(*Diamond v. Diehr*, 450 U.S. 175 (1981): text omitted from quotation.)

Further, claims define non-statutory processes if they either (1) consist **solely** of mathematical operations **without some** claimed practical application, or (2) **simply** manipulate abstract ideas **without some** claimed practical application (see MPEP 2106). Stated another way, claims define a statutory process if they are limited to a practical application within the technological arts (see MPEP 2106 or *Diamond v. Diehr*, 450 U.S. 175 at 183-184 (1981)).

### **Application of Law to Applicants' Claims**

Applicants' claims have a practical application in the technological arts since the claims produce a concrete, tangible, and useful result. In other words, the claims recite at least one step or one act that produces something that is concrete, tangible, and useful. By way of illustration only, claim 1 recites a computer implemented method for center-based clustering to identify  $k$  centers. The last recitations state: "outputting centers,  $c_1, \dots, c_k$ , as identified by said cluster of said sample, R." Thus, claim 1 **outputs** centers that are identified by said cluster of said sample. In other words, the claim recites a concrete, tangible, and useful result as an output of centers.

Claim 1 thus provides a "real world" value (i.e., the output centers). This real world value is more than a mere idea or concept. Further, the output of claim 1 proves that the claimed process does not consist **solely** of the manipulation of an abstract idea. By contrast, the claims provide a concrete and tangible result.

The legal position of the Applicants is clearly supported in MPEP 2106. Further, Applicants respectfully ask the Examiner to review the decision in *AT&T Corp. v. Excel Communications*, 172 F.3d 1352 at 1358 (Fed. Cir. 1999). The law clearly states: “Only when the claim is **devoid** of any limitation to a practical application in the technological arts should it be rejected under 35 USC 101” (MPEP 2106: Emphasis added). Applicants have shown that the claims are not devoid of any limitation to a practical application in the technological arts. As noted, claim 1 recites a real world value (i.e., the output centers).

Next, Applicants respectfully cite MPEP 2106 to support further their position:

The applicant is in the best position to explain why an invention is believed useful. Office personnel should therefore focus their efforts on pointing out statements made in the specification that identify all practical applications for the invention. Office personnel should **rely** on such statements throughout the examination when assessing the invention for compliance with all statutory criteria. An applicant may assert more than one practical application, but **only one is necessary to satisfy the utility requirement**. Office personnel should review the entire disclosure to determine the features necessary to accomplish at least one asserted practical application. (Bold added).

If the Examiner doubts the usefulness of the claimed invention, then Applicants respectfully ask the Examiner to read “Background of the Invention.” Here, Applicants discuss the numerous problems associated with the field of computer implemented clustering techniques. The background describes one exemplary problem:

Essentially, most prior art clustering methods are not designed to work with massively large datasets, especially because most computer implemented clustering methods require multiple passes through the entire datasets which may overwhelm or bog down a computer system if the dataset is too large. As such, it may not be feasible to cluster large datasets, even given the recent developments in large computing power. (Page 1, line 24 – page 2, line2).

Applicants' specification discusses numerous other examples of practical applications for the claimed invention. As another example, the specification clearly discusses a practical application to data mining and computer implemented clustering techniques:

The application of clustering to knowledge discovery and data mining require a clustering technique with quality and performance guarantees that apply to large datasets.... As described fully below, the fast sampling technique of the present invention is sublinear, and as such, significantly improves the efficiency of computer resources, reduces time of execution, and ultimately provides for an accurate, fast technique for clustering which is independent of the size of the data set. (Page 5, lines 11-22: text omitted).

Applicants submit that the specification discusses numerous other examples of practical applications. As one example, Applicants respectfully ask the Examiner to read the section entitled "Computer Implementation Efficiency" beginning on page 19.

## CONCLUSION

In view of the above, Applicants believe all pending claims are in condition for allowance. Allowance of these claims is respectfully requested.

Any inquiry regarding this Amendment and Response should be directed to Philip S. Lyren at Telephone No. (281) 514-8236, Facsimile No. (281) 514-8332. In addition, all correspondence should continue to be directed to the following address:

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CERTIFICATE UNDER 37 C.F.R. 1.8: The undersigned hereby certifies that this paper or papers, as described herein, are being deposited in the United States Postal Service, as first class mail, in an envelope address to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 7th day of December, 2004.

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